GEORGIA INSTITUTE OF TECHNOLOGY — OFFICE OF CONTRACT ADMINISTRATION

PROJECT ADMINISTRATION DATA SHEET

[x] ORIGINAL [ ] REVISION NO. _____

Project No. A-3185 DATE 3/15/82

Project Director: Mr. T. B. Elfe School/Lab EMSL

Sponsor: Teledyne Brown Engineering
Huntsville, AL 35807

Type Agreement: Letter subcontract #SC6774 dated 3/1/82

Award Period: From 3/1/82 To ~~4/15/82~~ 10/2/82 (Performance) _____ (Reports)

Sponsor Amount: $10,000 Contracted through:

Cost Sharing: _____ GTRI/~~GIT~~

Title: Microwave Transmitter and Materials Study

ADMINISTRATIVE DATA

OCA Contact Linda H. Bowman x4820

1) Sponsor Technical Contact:

Dave Greeley
Teledyne Brown Engr.
Cummings Research Park
Huntsville, AL 35807
205-536-4455

2) Sponsor Admin/Contractual Matters:

C.V. Gray
Teledyne Brown Engr.
Cummings Research Park
Huntsville, AL 35807
205-536-4455

Defense Priority Rating: none

Security Classification: none

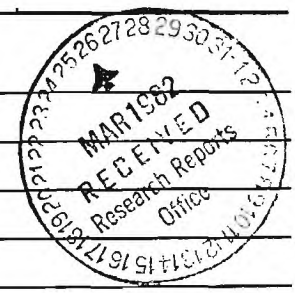
RESTRICTIONS

See Attached N/A Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval – Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with N/A

COMMENTS:



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FORM OCA 4:781

GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION SHEET

Date 5/5/83

Project Title: Microwave Transmitter and Materials Study

Project No: A-3185

Project Director: T. B. Elfe

Sponsor: Teledyne Brown Engineering

Effective Termination Date: 10/2/82

Clearance of Accounting Charges: 10/10/82

Grant/Contract Closeout Actions Remaining:

- [x] Final Invoice and Closing Documents
- [ ] Final Fiscal Report
- [ ] Final Report of Inventions
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other _____

No final report required. Cleared issuance of termination sheet with project director.

Assigned to: EMSL (~~School~~/Laboratory)

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Monthly Progress Report

MICROWAVE TRANSMITTER & MATERIALS STUDY

Reporting Period

5/1/82 - 5/31/82

Project A-3185

T. B. Elfe
Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia 30332

June 1982

During the month of May, activities on this program consisted of:

(1) Attending the SENTRY TWT Design Review at Hughes on May 25 and preparing a trip report on that meeting.

(2) Contacting U. S. tube manufacturers to determine whether there is an existing TWT which could be used in this system if arcing, turn-on, and vac-ion prohibition requirements were relaxed.

(3) Looking for additional information on poisoning of M cathodes during long shelf life.

All of these subjects have been covered fairly thoroughly in reports already submitted to Teledyne Brown Engineering. Highlights are:

SENTRY TWT Design Review

The TWT development program is progressing generally well. Beam Tester tests have produced a few arcs. Warmup time and grid current are the only areas in which performance does not meet specification. Hughes seems to be proceeding in the right direction to correct these discrepancies. We were able to convince Raytheon and MDAC to allow Hughes to install Vac-ion pumps on delivered tubes. Raytheon may or may not energize them.

Substitute TWT's

We contacted Hughes, Varian, and Litton. Varian and Hughes have tubes which are close in many respects, but frequency

ranges are slightly off. The Hughes tube is the 786H. The Varian tube is the VTX-5782A1. It does not appear that much, if any, time or money could be saved unless the system specs could be re-written around one of these tubes.

M Cathode Poisoning

Tony Muzzi had learned from Dr. George Haas of NRL that M cathodes had to be reactivated after simulated shelf life tests at NRL. I did not find any reference to this problem other than the papers by Dr. Haas and his colleagues; however, it is clearly a potential problem which needs to be looked into further. Lou Falce, the Hughes cathode expert, was to investigate further.

Planned activity for June involves preparing a transmitter and TWT briefing for Teledyne Brown and investigating other problems as they arise.

A-3183

MONTHLY PROGRESS REPORT

MICROWAVE TRANSMITTER
&
MATERIALS STUDY

Reporting Period
6/1/82 - 6/30/82

Project A-3185

T. B. Elfe
Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia 30332

July 1982

During the month of June there were no program meetings attended by Georgia Tech. Activities consisted of continued investigation into shelf life poisoning and doing some planning for the transmitter and TWT briefing.

On the potential shelf life poisoning problem, I had discussions with Dr. Otto Koppius, who had founded Semicon and Kometco before his retirement. Qualitatively, Dr. Koppius's experience confirmed the findings reported by Dr. George Haas of NRL that adsorbed gases on the cathode surface necessitate a reactivation of the cathode after long dormancy periods. He did say that a vac-ion pump or a getter would improve the situation, possibly to the extent of completely solving the problem.

Following the discussion with Dr. Koppius permission was obtained from MDAC and Raytheon for me to contact Lou Falc of Hughes. He had an encouraging report that the beam tester had shown absolutely no sign of shelf life poisoning after a month or more dormancy. His opinion was that the getter is still fairly effective at room temperature and may be making a significant contribution.

This should still be regarded as a potential problem, although present indications are that the getter and/or the vac-ion pump may be sufficiently effective. The present basing concept apparently makes the impact of such a problem less severe than previously.

Plans for July activity originally included attending a tube meeting at Hughes. This meeting has now been closed to BMD and SETAC. I shall try to complete preparation of the TWT briefing material.

A-3185

MONTHLY PROGRESS REPORT

MICROWAVE TRANSMITTER
&
MATERIALS STUDY

Reporting Period
7/1/82 - 7/31/82

Project A-3185

T. B. Elfe
Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia 30332

August 1982

During the month of July there were no program meetings attended by Georgia Tech. Activity consisted of preparing a TWT briefing and attempting to keep abreast of activity in the potential TWT shelf life problem area.

It is anticipated that Georgia Tech will attend a transmitter IPR meeting in August and prepare a report on the transmitter and TWT.

MONTHLY PROGRESS REPORT

MICROWAVE TRANSMITTER
&
MATERIALS STUDY

Reporting Period
8/2/82 - 8/31/82

Project A-3185

T. B. Elfe
Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia 30332

September 1982

Activities for August included attending a Transmitter IPR meeting at Raytheon Equipment Division on August 11. A detailed report of that portion of the meeting which dealt with the traveling wave tube and transmitter was prepared and submitted to Teledyne Brown in August.

During September, it is anticipated that there will be a kickoff meeting for the NRL program to support the Hughes work on potential shelf life problems, attended by the Army, NRL, Hughes, Raytheon, and Georgia Tech. There is also a SETAC Sentry Radar Status Review the following day, which Georgia Tech has been asked to attend. We shall try to schedule both, although this may be difficult.

A-3182

MONTHLY PROGRESS REPORT

MICROWAVE TRANSMITTER
&
MATERIALS STUDY

Reporting Period
9/1/82 - 9/30/82

T. B. Elfe
Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia 30332

October 1982

Activity during September included a visit to Hughes Electron Dynamics Division to attend a meeting concerning the SENTRY TWT. The main purpose of the meeting was to initiate a program wherein the Naval Research Laboratory is to investigate the potential shelf life poisoning problem in the TWT and recommend solutions. In addition, Hughes updated progress on the tube development. This meeting is covered in detail in a separate trip report. In summary, Hughes seems glad to have NRL in the circuit. What could have been a very awkward problem can be addressed soon enough to do something about it before it reaches crisis state. The development of the tube seems to be proceeding mostly on schedule with few, if any, major problems.

The preparation of the TWT briefing was completed. The problem of the effect of phase and amplitude differences on power combining was considered, but it was decided to postpone extensive effort on this problem to conserve funding.

No activity is currently planned for October. At present, it appears there is an insurmountable problem in negotiating the contract renewal.